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**Liu**

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(54) **DISPLAY DEVICE AND REPAIRING METHOD FOR THE SAME**

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(58) **Field of Classification Search** ..... None  
See application file for complete search history.

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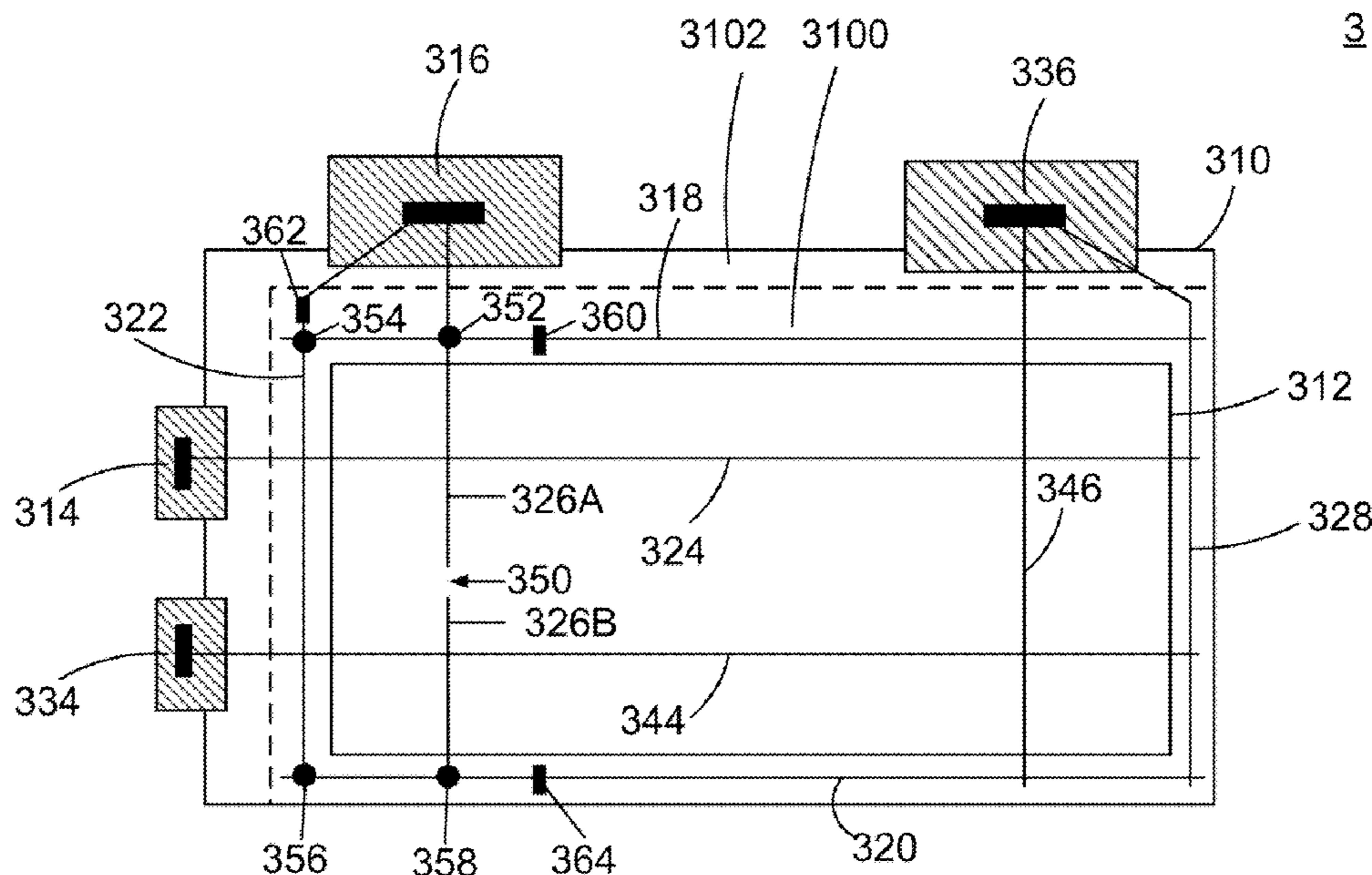
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(57) **ABSTRACT**

A display device and a repairing method for the same are disclosed. The display device includes a substrate, a pixel array, at least one gate driver unit, at least one source driver unit, a first repair line, a second repair line, a first dummy line, and a second dummy line. The first repair line is disposed between the pixel array and the source driver unit. The second repair line is disposed opposite to the first repair line on the pixel array. The first dummy line and the second dummy line are respectively disposed at two sides of the pixel array and crossing the gate lines, the first repair line, and the second repair line. A signal transmission is not required to go around the outmost periphery of the gate driver unit in a repairing process. As a result, the signal attenuation can be decreased effectively.

**10 Claims, 7 Drawing Sheets**



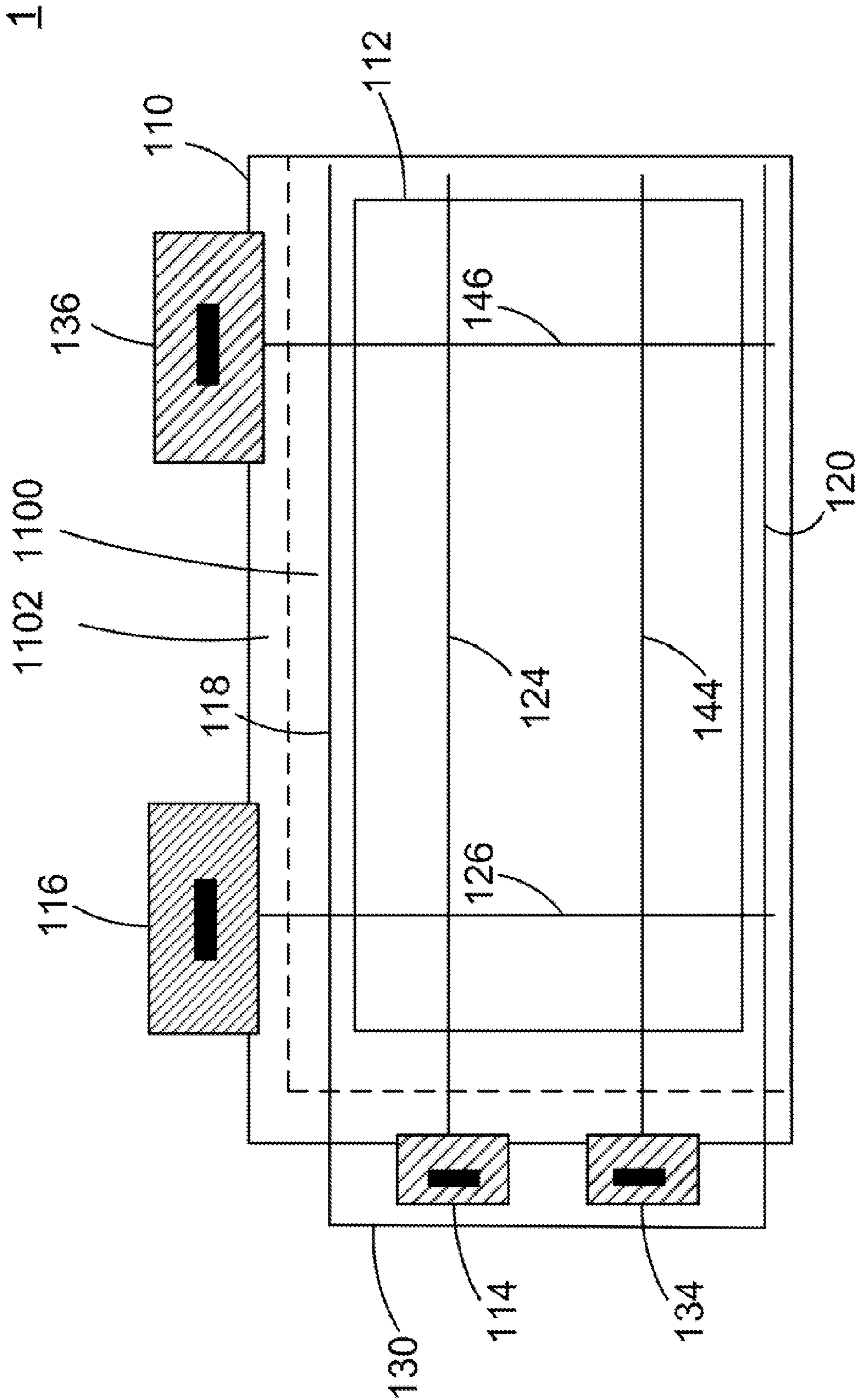


FIG. 1 (PRIOR ART)

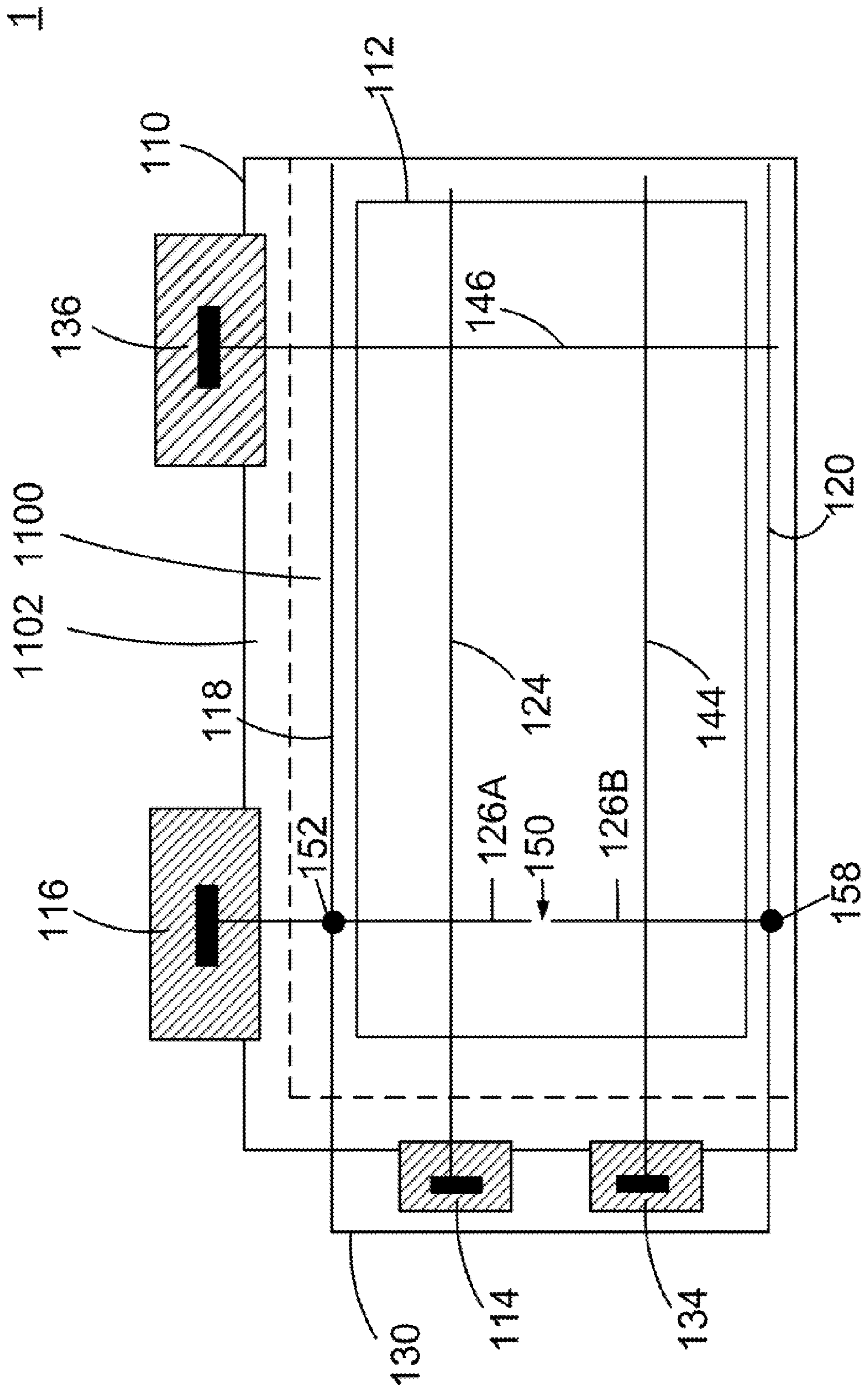


FIG. 2 (PRIOR ART)

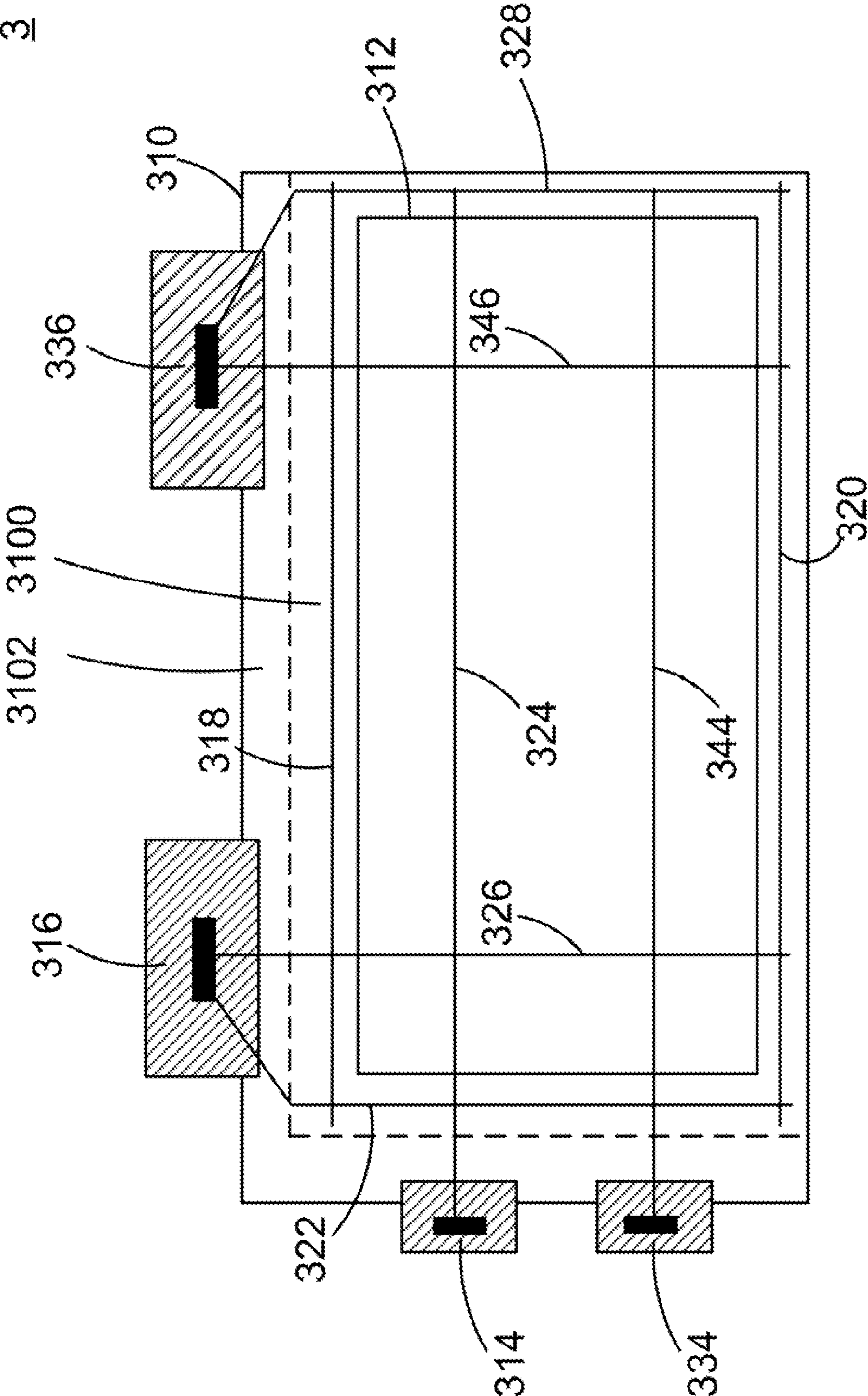


FIG. 3

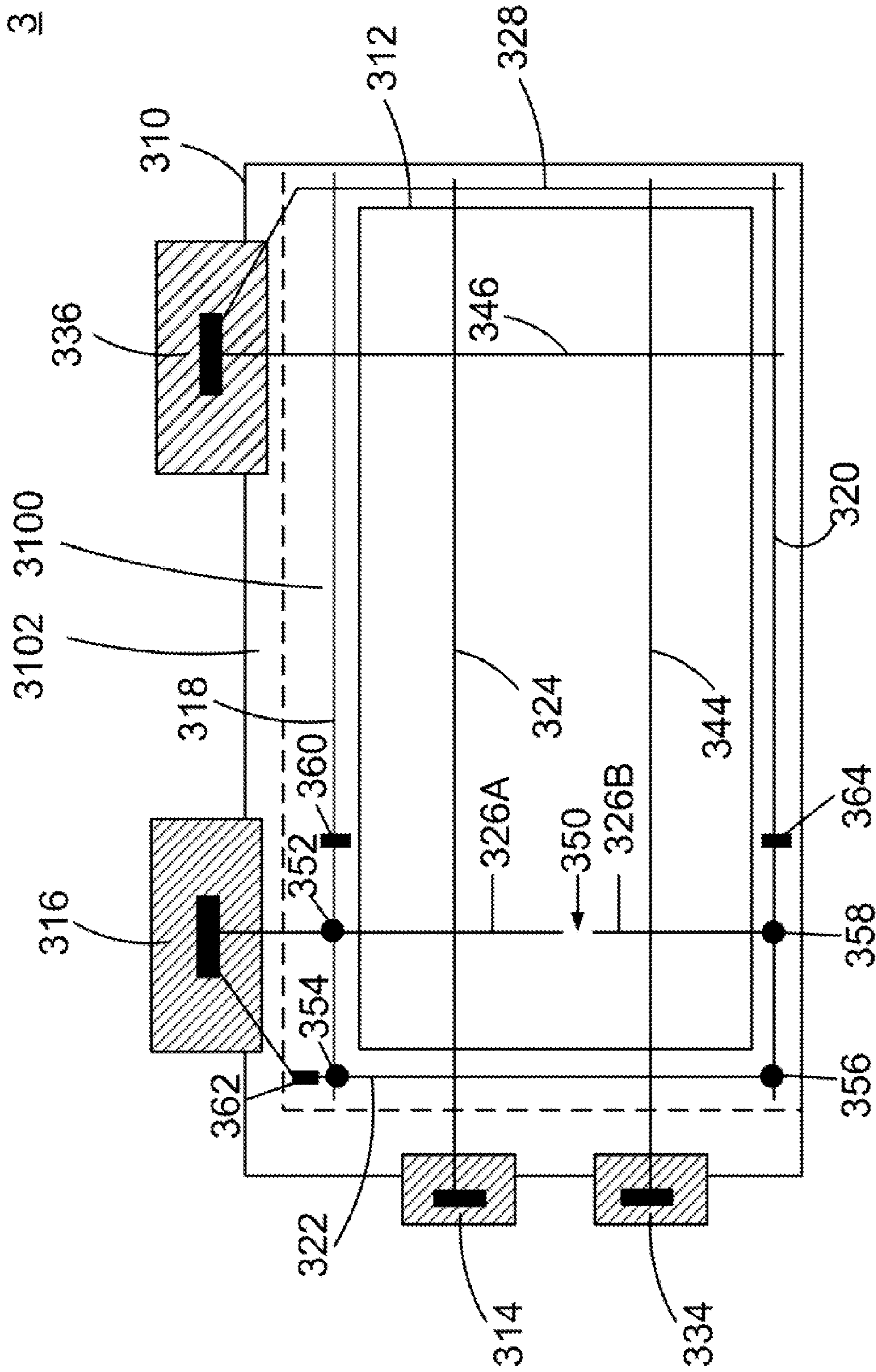


FIG. 4

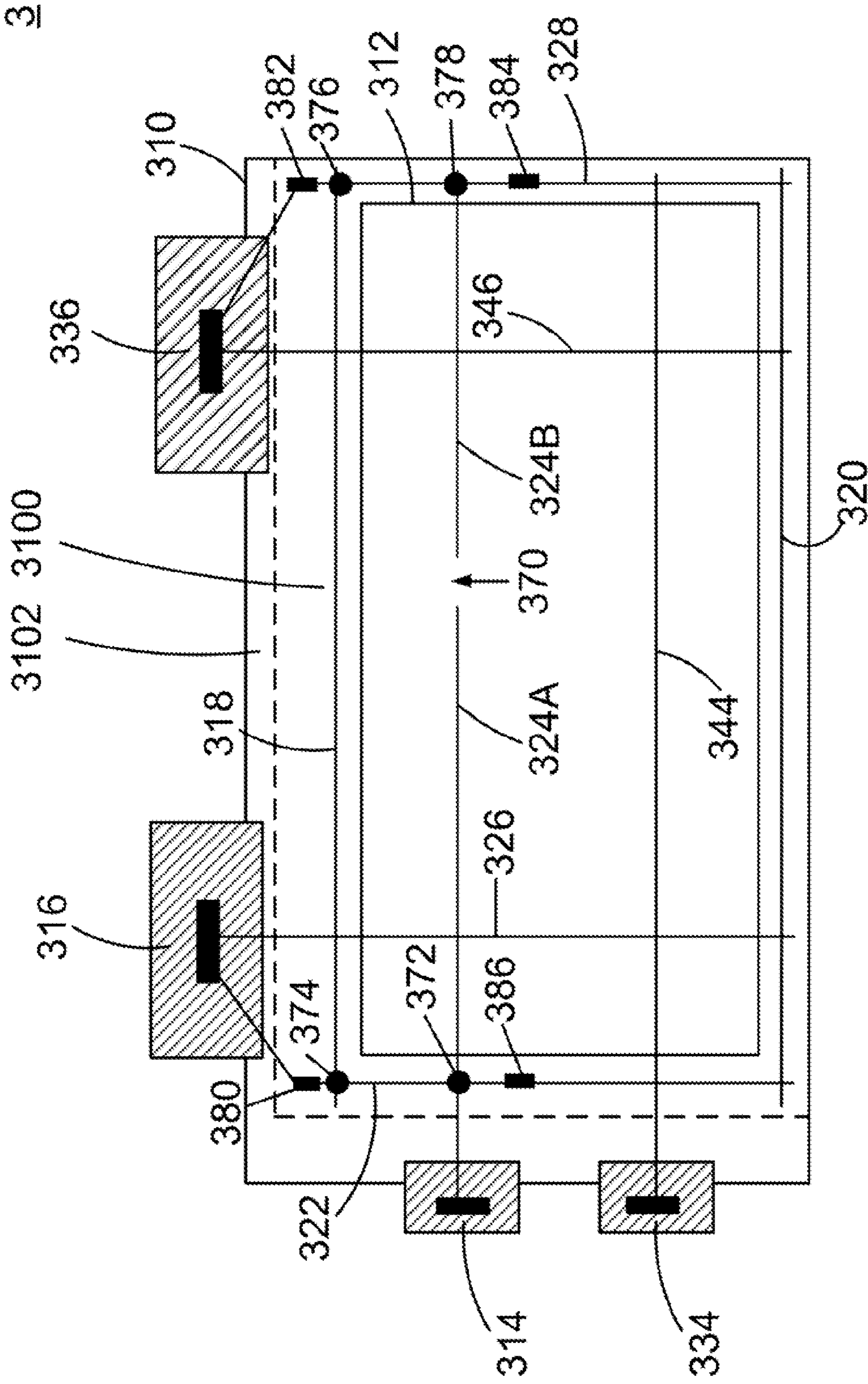
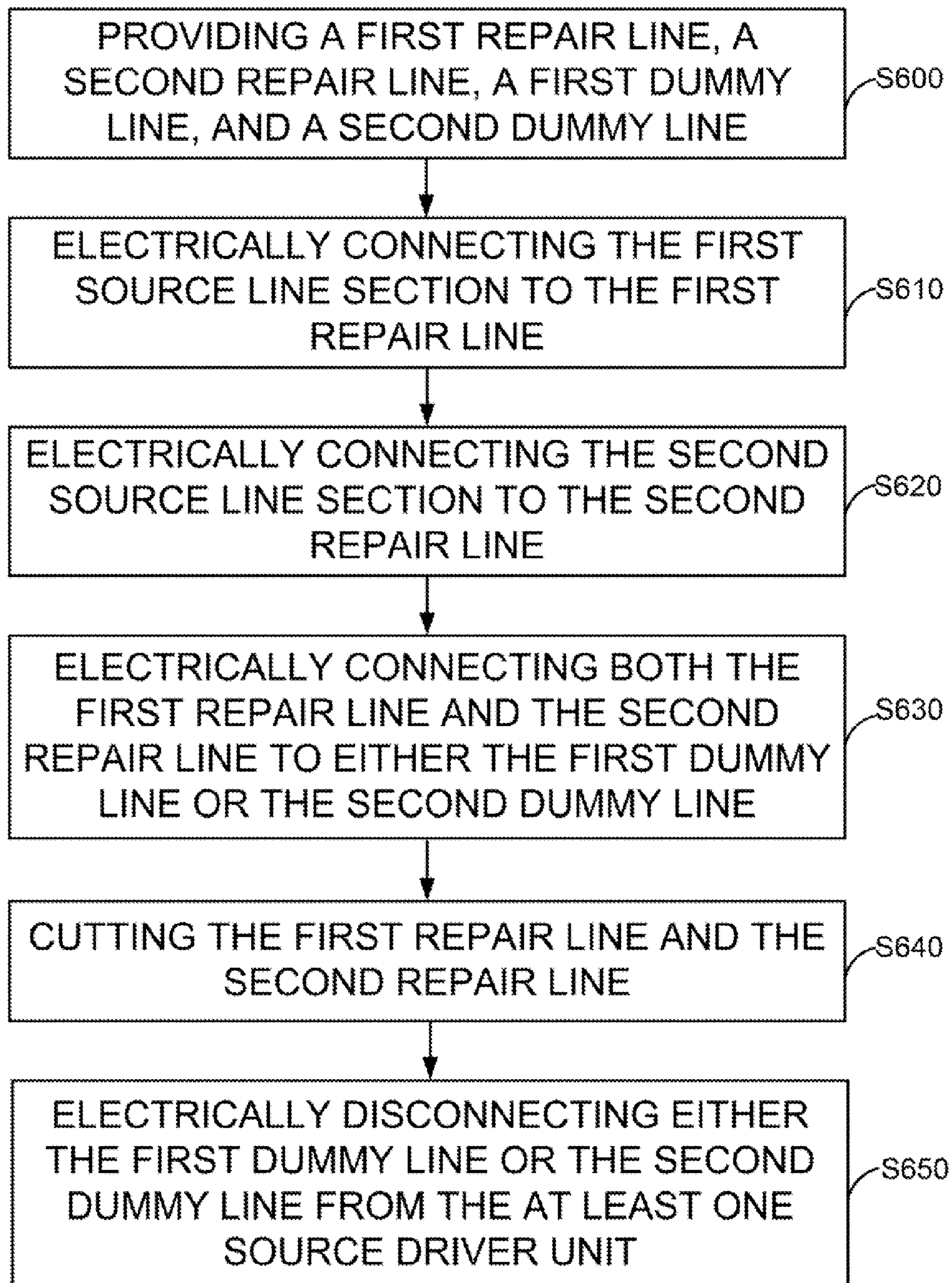
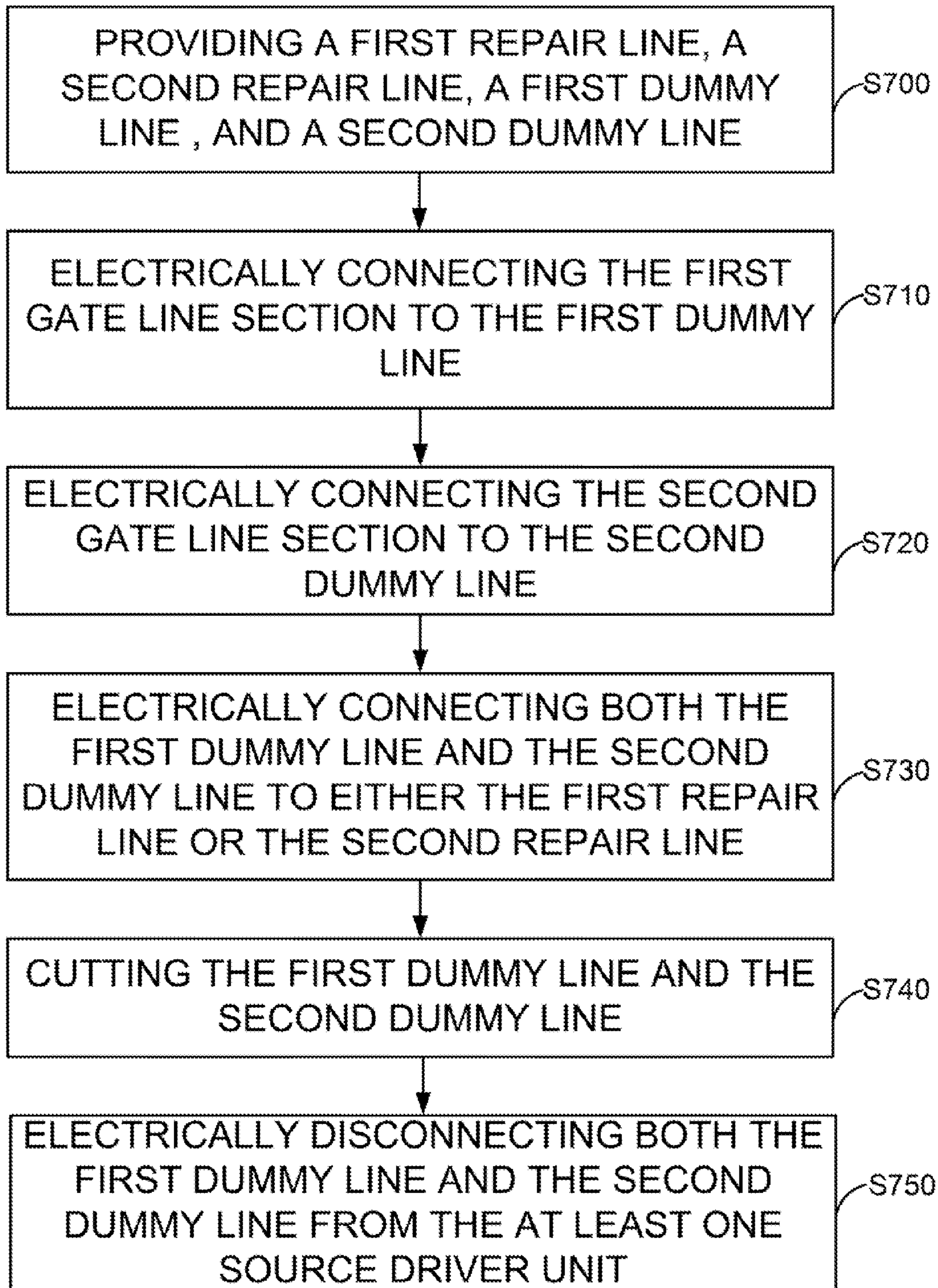


FIG. 5

**FIG. 6**

**FIG. 7**



## 1

**DISPLAY DEVICE AND REPAIRING  
METHOD FOR THE SAME**

## BACKGROUND OF THE INVENTION

## 1. Field of the Invention

The present invention generally relates to a display device, and more particularly to a display device having repair lines and a repairing method for the same.

## 2. Description of Prior Art

Please refer to FIG. 1, which illustrates a conventional display device 1. The display device 1 comprises a substrate 110, a pixel array 112, two gate driver units 114, 134, two source driver units 116, 136, a first repair line 118, a second repair line 120, and a third repair line 130.

The substrate 110 comprises a display area 1100 and a non-display area 1102. The pixel array 112 is disposed on the display area 1100 and comprises a plurality of gate lines 124, 144, and a plurality of source lines 126, 146. The gate lines 124, 144, and the source lines 126, 146, cross each other. The gate driver units 114, 134, are disposed on the non-display area 1102. The gate driver units 114, 134, are electrically connected to the gate lines 124, 144, for driving the gate lines 124, 144, respectively. The source driver units 116, 136, are also disposed on the non-display area 1102. The source driver units 116, 136, are electrically connected to the source lines 126, 146, for providing display data to the source lines 126, 146, respectively. The first repair line 118 is disposed between the pixel array 112 and the source driver units 116, 136. The first repair line 118 crosses but does not contact the source lines 126, 146, that is, the first repair line 118 is not electrically connected to the source lines 126, 146. The second repair line 120 is disposed opposite to the first repair line 118 on the pixel array 112. The second repair line 120 crosses but does not contact the source lines 126, 146, that is, the second repair line 120 is not electrically connected to the source lines 126, 146. The third repair line 130 is disposed on the outmost periphery of the gate driver units 114, 134, and two ends of the third repair line 130 are electrically connected to the first repair line 118 and the second repair line 120, respectively.

Please refer to FIG. 2, which is a diagram illustrating repairing the source line 126 in the conventional display device 1. When the source line 126 has a defect 150 (e.g. a disconnected point), the source line 126 is divided into a first source line section 126A and a second source line section 126B. The first source line section 126A still can receive signals from the source driver unit 116, but the second source line section 126B cannot receive the signals from the source driver unit 116 owing to the defect 150. As a result, the image quality of the display device 1 will be affected because the second source line section 126B fails to receive correct data.

To repair the first source line 126, an overlapping position between the first source line section 126A and the first repair line 118 (i.e. a welding point 152) and an overlapping position between the second source line section 126B and the second repair line 120 (i.e. a welding point 158) are welded by laser. As a result, not only the first source line section 126A can receive the signals from the source driver unit 116, but also the second source line section 126B can receive the signals from the source driver unit 116 via the first repair line 118, the third repair line 130, and the second repair line 120.

However, when the source line section 126B receives the signals from the source driver unit 116 via the first repair line 118, the third repair line 130, and the second repair line 120, a transmission path of the signals goes around the outmost periphery of the gate driver units 114, 134. Therefore, the signals will attenuate because the transmission path is longer.

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The signal attenuation problem is more serious especially in a larger size display panel, and accordingly the repair effect is not good.

Therefore, there is a need for a solution to the above-mentioned problem of signal attenuation in the conventional repair line structure.

## SUMMARY OF THE INVENTION

An objective of the present invention is to provide a display device and a repairing method for the same, which are capable of decreasing signal attenuation due to a longer transmission path of repair lines.

To accomplish the invention objective, the display device according to the present invention comprises a substrate, a pixel array, at least one gate driver unit, at least one source driver unit, a first repair line, a second repair line, a first dummy line, and a second dummy line. The substrate comprises a display area and a non-display area. The pixel array is disposed on the display area. The pixel array comprises a plurality of gate lines and a plurality of source lines. The at least one gate driver unit is disposed on the non-display area for driving the gate lines. The at least one source driver unit is disposed on the non-display area for providing display data to the source lines. The first repair line is disposed between the pixel array and the at least one source driver unit, and the first repair line crosses the source lines. The first repair line in an initial state is electrically insulated from the source lines. The second repair line is disposed opposite to the first repair line on the pixel array, and the second repair line crosses the source lines. The second repair line in an initial state is electrically insulated from the source lines. The first dummy line is disposed at one side of the pixel array, and the first dummy line crosses the gate lines, the first repair line, and the second repair line. The first dummy line in an initial state is electrically insulated from the gate lines, the first repair line, and the second repair line. The second dummy line is disposed opposite to the first dummy line on the pixel array, and the second dummy line crosses the gate lines, the first repair line, and the second repair line. The second dummy line in an initial state is electrically insulated from the gate lines, the first repair line, and the second repair line.

In the repairing method for the display device according to the present invention, the display device comprises a pixel array, at least one gate driver unit, and at least one source driver unit. The pixel array comprises a plurality of gate lines and a plurality of source lines. One of the source lines are divided into a first source line section and a second source line section. The first source line section and the second source line section are discrete. The first source line section is electrically connected to the at least one source driver unit. The repairing method comprises steps below.

A first repair line disposed between the pixel array and the at least one source driver unit, a second repair line disposed opposite to the first repair line on the pixel array, a first dummy line disposed at one side of the pixel array, and a second dummy line disposed opposite to the first dummy line on the pixel array are provided. The first repair line crosses the source lines and in an initial state is electrically insulated from the source lines. The second repair line crosses the source lines and in an initial state is electrically insulated from the source lines. The first dummy line crosses the gate lines, the first repair line, and the second repair line. The first dummy line in an initial state is electrically insulated from the gate lines, the first repair line, and the second repair line. The second dummy line crosses the gate lines, the first repair line,

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and the second repair line. The second dummy line in an initial state is insulated from the gate lines, the first repair line, and the second repair line.

The first source line section is electrically connected to the first repair line.

The second source line section is electrically connected to the second repair line.

The first repair line and the second repair line are electrically connected to either the first dummy line or the second dummy line.

The first repair line and the second repair line are cut to electrically connect the first source line section to the second source line section via a portion of the first repair line, either the first dummy line or the second dummy line, and a portion of the second repair line.

In the repairing method for the display device according to the present invention, the display device comprises a pixel array, at least one gate driver unit, and at least one source driver unit. The pixel array comprises a plurality of gate lines and a plurality of source lines. One of the gate lines is divided into a first gate line section and a second gate line section. The first gate line section and the second gate line section are discrete. The first gate line section is electrically connected to the at least one gate driver unit. The repairing method comprises steps below.

A first repair line disposed between the pixel array and the at least one source driver unit, a second repair line disposed opposite to the first repair line on the pixel array, a first dummy line disposed at one side of the pixel array, and a second dummy line disposed opposite to the first dummy line on the pixel array are provided. The first repair line crosses the source lines and in an initial state is electrically insulated from the source lines. The second repair line crosses the source lines and in an initial state is electrically insulated from the source lines. The first dummy line crosses the gate lines, the first repair line, and the second repair line. The first dummy line in an initial state is electrically insulated from the gate lines, the first repair line, and the second repair line. The second dummy line crosses the gate lines, the first repair line, and the second repair line. The second dummy line in an initial state is insulated from the gate lines, the first repair line, and the second repair line.

The first gate line section is electrically connected to the first dummy line.

The second gate line section is electrically connected to the second dummy line.

The first dummy line and the second dummy line are electrically connected to either the first repair line or the second repair line.

The first dummy line and the second dummy line are cut to electrically connect the first gate line section to the second gate line section via a portion of the first dummy line, either the first repair line or the second repair line, and a portion of the second dummy line.

The display device and the repairing method for the same utilize the first dummy line and the second dummy line as auxiliary repair lines, so that a signal transmission of the repair lines is not required to go around the outmost periphery of the gate driver unit. As a result, the signal attenuation can be decreased effectively, especially in a larger size display panel.

#### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 illustrates a conventional display device;

FIG. 2 is a diagram illustrating repairing a source line in the conventional display device;

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FIG. 3 is a schematic diagram showing a display device according to the present invention;

FIG. 4 is a diagram illustrating repairing a source line in the display device of the present invention;

FIG. 5 is a diagram illustrating repairing a gate line in the display device of the present invention;

FIG. 6 illustrates a flow chart of a repairing method for a display device according to the present invention; and

FIG. 7 illustrates a flow chart of another repairing method for a display device according to the present invention.

#### DETAILED DESCRIPTION OF THE INVENTION

Please refer to FIG. 3, which is a schematic diagram showing a display device 3 according to the present invention. The display device 3 comprises a substrate 310, a pixel array 312, at least one gate driver unit (represented by gate driver units 314, 334, in FIG. 3), at least one source driver unit (represented by source driver units 316, 336, in FIG. 3), a first repair line 318, a second repair line 320, a first dummy line 322, and a second dummy line 328.

The substrate 310 comprises a display area 3100 and a non-display area 3102 which is adjacent to the display area 3100. The pixel array 312 is disposed on the display area 3100 for displaying images. The pixel array 312 comprises a plurality of gate lines (represented by gate lines 324, 344, in FIG. 3), a plurality of source lines (represented by source lines 326, 346, in FIG. 3), and a plurality of pixels (not shown). The gate lines 324, 344, and the source lines 326, 346, cross each other. Each one of the pixels (not shown) is corresponding to one of the gate lines 324, 344, and one of the source lines 326, 346. The gate driver units 314, 334, are disposed on the non-display area 3102, and the gate driver units 314, 334, are electrically connected to the gate lines 324, 344, for driving the gate lines 324, 344, respectively. The source driver units 316, 336, are also disposed on the non-display area 3102, and the source driver units 316, 336, are electrically connected to the source lines 326, 346, for providing display data to the source lines 326, 346, respectively. The first repair line 318 is disposed between the pixel array 312 and the source driver units 316, 336, and the first repair line 318 crosses but does not contact the source lines 326, 346. The first repair line 318 in an initial state is electrically insulated from the source lines 326, 346, that is, the first repair line 318 in an initial state is not electrically connected to the source lines 326, 346. The second repair line 320 is disposed opposite to the first repair line 318 on the pixel array 312, and the second repair line 320 crosses but does not contact the source lines 326, 346. The second repair line 320 in an initial state is electrically insulated from the source lines 326, 346, that is, the second repair line 320 in an initial state is not electrically connected to the source lines 326, 346.

The first dummy line 322 and the second dummy line 328 are disposed at two sides of the pixel array 312. The first dummy line 322 is disposed between the pixel array 312 and the gate driver units 314, 334. One end of the first dummy line 322 is electrically connected to the source driver unit 316. In one preferred embodiment, the first dummy line 322 is disposed on the display area 3100. The first dummy line 322 crosses but does not contact the gate lines 324, 344, the first repair line 318, and the second repair line 320. The first dummy line 322 in an initial state is electrically insulated from the gate lines 324, 344, the first repair line 318, and the second repair line 320. That is, the first dummy line 322 in an initial state is not electrically connected to the gate lines 324, 344, the first repair line 318, and the second repair line 320.

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The second dummy line **328** is disposed apart from the gate driver units **314**, **334**, that is, opposite to the first dummy line **322** on the pixel array **312**. The second dummy line **328** is electrically connected to the source driver unit **336**. In one preferred embodiment, the second dummy line **328** is disposed on the display area **3100**. The second dummy line **328** crosses but does not contact the gate lines **324**, **344**, the first repair line **318**, and the second repair line **320**. The second dummy line **328** in an initial state is electrically insulated from the gate lines **324**, **344**, the first repair line **318**, and the second repair line **320**. That is, the second dummy line **328** in an initial state is not electrically connected to the gate lines **324**, **344**, the first repair line **318**, and the second repair line **320**.

Please refer to FIG. 4, which is a diagram illustrating repairing the source line **326** in the display device **3** of the present invention. When the source line **326** has a defect **350** (e.g. a disconnected point), the source line **326** are divided into a first source line section **326A** and a second source line section **326B**. The first source line section **326A** and the second source line section **326B** are discrete. The first source line section **326A** still can receive signals of the source driver unit **316**, but the second source line section **326B** fails to receive the signals of the source driver unit **316** owing to the defect **350**. As a result, the image quality of the display device **3** will be affected because the second source line section **326B** fails to receive correct data.

To transmit the signals of the source driver unit **316** to the second source line section **326B**, a repairing method is to electrically connect the first source line section **326A** to the first repair line **318**, the second source line section **326B** to the second repair line **320**, the first dummy line **322** to the first repair line **318**, and the first dummy line **322** to the second repair line **320**. As a result, the second source line section **326B** can receive the signals from the source driver unit **316** via the first repair line **318**, the first dummy line **322**, and the second repair line **320**. A sequence of electrically connecting is not limited. A method for electrically connecting, for example, is to weld at an overlapping position (i.e. a welding point **352**) between the first source line section **326A** and the first repair line **318**, an overlapping position (i.e. a welding point **354**) between the first dummy line **322** and the first repair line **318**, an overlapping position (i.e. a welding point **356**) between the first dummy line **322** and the second repair line **320**, and an overlapping position (i.e. a welding point **358**) between the second source line section **326B** and the second repair line **320**. Accordingly, not only the first source line section **326A** can receive the signals from the source driver unit **316**, but also the second source line section **326B** can receive the signals from the source driver unit **316** via the first repair line **318**, the first dummy line **322**, and the second repair line **320**.

The next step is to cut the first repair line **318** and the second repair line **320**, and to electrically disconnect the first dummy line **322** from the source driver unit **316**, so that the first source line section **326A** can be electrically connected to the second source line section **326B** via a portion of the first repair line **318**, a first dummy line **322**, and a portion of the second repair line **320**. In the present embodiment, the right side of the welding point **352** (i.e. a cutting point **360**) is cut, the first dummy line **322** is electrically disconnected from the source driver unit **316** (i.e. a cutting point **362**), the right side of the welding point **358** (i.e. a cutting point **364**) is cut, so that the second source line section **326B** can receive the signals from the source driver unit **316** via the first repair line **318**, the first dummy line **322**, and the second repair line **320** without affecting the signals of the source line **346**. A method for

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cutting and electrically disconnecting is to cut at the cutting points **360**, **362**, **364** by laser. It is noted that in another embodiment, cutting and electrically disconnecting (such as cutting by laser) can be first implemented and then electrically connecting (such as welding by laser) in the repair processes. The sequence of cutting and disconnecting and the sequence of the electrically connecting can be switched.

Further, in another embodiment, a repairing method is to electrically connect the first source line section **326A** to the first repair line **318**, the second source line section **326B** to the second repair line **320**, the second dummy line **328** to the first repair line **318**, and the second dummy line **328** to the second repair line **320**. As a result, the second source line section **326B** can receive the signals from the source driver unit **316** via the first repair line **318**, the second dummy line **328**, and the second repair line **320**.

Please refer to FIG. 5, which is a diagram illustrating repairing the gate line **324** in the display device **3** of the present invention. When the gate line **324** has a defect **370** (e.g. a disconnected point), the gate line **324** are divided into a first gate line section **324A** and a second gate line section **324B**. The first gate line section **324A** and the second gate line section **324B** are discrete. The first gate line section **324A** still can receive signals of the gate driver unit **314**, but the second gate line section **324B** fails to receive the signals of the gate driver unit **314** owing to the defect **370**. As a result, the image quality of the display device **3** will be affected because the second gate line section **324B** fails to be driven.

To transmit the signals of the gate driver unit **314** to the second gate line section **324B**, a repairing method is to electrically connect the first gate line section **324A** to the first dummy line **322**, the second gate line section **324B** to the second dummy line **328**, the first dummy line **322** to the first repair line **318**, and the second dummy line **328** to the first repair line **318**. As a result, the second gate line section **324B** can receive the signals from the gate driver unit **314** via the first dummy line **322**, the first repair line **318**, and the second dummy line **328**. A sequence of electrically connecting is not limited. A method for electrically connecting, for example, is to weld at an overlapping position (i.e. a welding point **372**) between the first gate line section **324A** and the first dummy line **322**, an overlapping position (i.e. a welding point **374**) between the first dummy line **322** and the first repair line **318**, an overlapping position (i.e. a welding point **376**) between the first repair line **322** and the second dummy line **328**, and an overlapping position (i.e. a welding point **378**) between the second dummy line **328** and the second gate line section **324B**. As a result, not only the first gate line section **324A** can receive the signals from the gate driver unit **314**, but also the second gate line section **324B** can receive the signals from the gate driver unit **314** via the first dummy line **322**, the first repair line **318**, and the second dummy line **328**.

The next step is to electrically disconnect the first dummy line **322** from the source driver unit **316** and the second dummy line **328** from the source driver unit **336**, and to cut the first dummy line **322** and the source driver unit **316**, so that the first gate line section **324A** can be electrically connected to the second gate line section **324B** via a portion of the first dummy line **322**, a first repair line **318**, and a portion of the second dummy line **320**. In the present embodiment, the first dummy line **322** is electrically disconnected from the source driver unit **316** (i.e. a cutting point **380**), the second dummy line **328** is electrically disconnected from the source driver unit **336** (i.e. a cutting point **382**), a position below the welding point **378** (i.e. a cutting point **384**) is cut, and a position below the welding point **372** (i.e. a cutting point **386**) is cut, so that the second gate line section **324B** can receive the signals

from the gate driver unit **314** via the first dummy line **322**, the first repair line **318**, and the second dummy line **328** without affecting the signals of the gate line **344**. A method for cutting and electrically disconnecting is to cut at the cutting points **380, 382, 384, 386**, by laser. It is noted that in another embodiment, cutting and electrically disconnecting (such as cutting by laser) can be first implemented and then electrically connecting (such as welding by laser) in the repair processes. The sequence of cutting and disconnecting and the sequence of the electrically connecting can be switched.

Further, in another embodiment, a repairing method is to electrically connect the first gate line section **324A** to the first dummy line **322**, the second gate line section **324B** to the second dummy line **328**, the second repair line **320** to the first dummy line **322**, and the second repair line **320** to the second dummy line **328**. As a result, the second gate line section **324B** can receive the signals from the gate driver unit **314** via the first dummy line **322**, the second repair line **320**, and the second dummy line **328**.

It is noted that the first dummy line **322** and the second dummy line **328** are respectively disposed at two sides of the pixel array **312** and electrically connected to the source driver units **316, 336**. Although the first dummy line **322** and the second dummy line **328** are disposed on the display area **3100**, the first dummy line **322** and the second dummy line **328** do not have a function of displaying images. That is, the first dummy line **322** and the second dummy line **328** are not electrically connected to the pixels (not shown) of the pixel array **312**. The first dummy line **322** and the second dummy line **328** are electrically connected only to dummy pixels (not shown). The dummy pixels (not shown) are disposed on the outermost periphery of the pixel array **312** and do not have the function of displaying the images. The dummy pixels (not shown) are utilized for decreasing noise around the pixel array **312**, i.e. decreasing an influence of the noise on the pixels (not shown) of the pixel array **312**. The first dummy line **322** and the second dummy line **328** can be regarded as dummy data lines before they function as auxiliary repair lines. The first dummy line **322** and the second dummy line **328** make the images displayed by the pixel array **312** more stable by receiving voltages provided by the source driver units **316, 336**. After the first dummy line **322** and the second dummy line **328** function as the auxiliary repair lines, they will be electrically disconnected from the source driver units **316, 336**, and accordingly will not function as the dummy data lines.

The display device **3** according to the present invention utilizes the first dummy line **322** and the second dummy line **328** as the auxiliary repair lines, so that a signal transmission is not required to go around the outermost periphery of the gate driver units **314, 334**. As a result, signal attenuation can be decreased effectively, especially in a larger size display panel.

Please refer to FIG. **6**, which illustrates a flow chart of a repairing method for a display device according to the present invention. The display device comprises a pixel array, at least one gate driver unit, and at least one source driver unit. The pixel array comprises a plurality of gate lines and a plurality of source lines. One of the source lines is divided into a first source line section and a second source line section. The first source line section and the second source line section are discrete. The first source line section is electrically connected to the at least one source driver unit. The repairing method comprises steps below.

In step **600**, a first repair line, a second repair line, a first dummy line, and a second dummy line are provided. The first repair line is disposed between the pixel array and the at least one source driver unit. The first repair line crosses the source

lines and in an initial state is electrically insulated from the source lines. The second repair line is disposed opposite to the first repair line on the pixel array. The second repair line crosses the source lines and in an initial state is electrically insulated from the source lines. The first dummy line is disposed at one side of the pixel array. The first dummy line crosses the gate lines, the first repair line, and the second repair line, and the first dummy line in an initial state is electrically insulated from the gate lines, the first repair line, and the second repair line. The second dummy line is disposed opposite to the first dummy line on the pixel array. The second dummy line crosses the gate lines, the first repair line, and the second repair line, and the second dummy line in an initial state is insulated from the gate lines, the first repair line, and the second repair line.

In step **S610**, the first source line section is electrically connected to the first repair line.

In step **S620**, the second source line section is electrically connected to the second repair line.

In step **S630**, both the first repair line and the second repair line are electrically connected to either the first dummy line or the second dummy line.

In step **S640**, the first repair line and the second repair line are cut, so that the first source line section is electrically connected to the second source line section via a portion of the first repair line, either the first dummy line or the second dummy line, and a portion of the second repair line.

In the above-mentioned steps **S610~S630**, a method for electrically connecting is to weld by laser. Further, in the step **S640**, a method for cutting is by laser.

In one embodiment, either the first dummy line or the second dummy line is electrically connected to the at least one source driver unit, and the repairing method further comprises: in step **S650**, either the first dummy or the second dummy line is electrically disconnected from the at least one source driver unit. A method for electrically disconnecting is to cut by laser.

Please refer to FIG. **7**, which illustrates a flow chart of another repairing method for a display device according to the present invention. The display device comprises a pixel array, at least one gate driver unit, and at least one source driver unit. The pixel array comprises a plurality of gate lines and a plurality of source lines. One of the gate lines is divided into a first gate line section and a second gate line section. The first gate line section and the second gate line section are discrete. The first gate line section is electrically connected to the at least one gate driver unit. The repairing method comprises steps below.

In step **700**, a first repair line, a second repair line, a first dummy line, and a second dummy line are provided. The first repair line is disposed between the pixel array and the at least one source driver unit. The first repair line crosses the source lines and in an initial state is electrically insulated from the source lines. The second repair line is disposed opposite to the first repair line on the pixel array. The second repair line crosses the source lines and in an initial state is electrically insulated from the source lines. The first dummy line is disposed at one side of the pixel array. The first dummy line crosses the gate lines, the first repair line, and the second repair line, and the first dummy line in an initial state is electrically insulated from the gate lines, the first repair line, and the second repair line. The second dummy line is disposed opposite to the first dummy line on the pixel array. The second dummy line crosses the gate lines, the first repair line, and the second repair line, and the second dummy line in an initial state is insulated from the gate lines, the first repair line, and the second repair line.

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In step S710, the first gate line section is electrically connected to the first dummy line.

In step S720, the second gate line section is electrically connected to the second dummy line.

In step S730, the first dummy line and the second dummy line are electrically connected to either the first repair line or the second repair line.

In step S740, the first dummy line and the second dummy line are cut, so that the first gate line section is electrically connected to the second gate line section via a portion of the first dummy line, either the first repair line or the second repair line, and a portion of the second dummy line.

In the above-mentioned steps S710~S730, a method for electrically connecting is to weld by laser. Further, in the step S740, a method for cutting is by laser.

In one embodiment, the first dummy line and the second dummy line are electrically connected to the at least one source driver unit, and the repairing method further comprises: in step S750, the first dummy line and the second dummy line are electrically disconnected from the at least one source driver unit. A method for electrically disconnecting is to cut by laser.

As is understood by a person skilled in the art, the foregoing preferred embodiments of the present invention are illustrative rather than limiting of the present invention. It is intended that they cover various modifications and similar arrangements be included within the spirit and scope of the appended claims, the scope of which should be accorded the broadest interpretation so as to encompass all such modifications and similar structure.

What is claimed is:

1. A repairing method for a display device, the display device comprising a pixel array, at least one gate driver unit, and at least one source driver unit, the pixel array comprising a plurality of gate lines and a plurality of source lines, one of the source lines being divided into a first source line section and a second source line section, the first source line section and the second source line section being discrete, and the first source line section electrically connected to the at least one source driver unit, the repairing method comprising the following steps:

providing a first repair line disposed between the pixel array and the at least one source driver unit, a second repair line disposed opposite to the first repair line on the pixel array, a first dummy line disposed at one side of the pixel array, and a second dummy line disposed opposite to the first dummy line on the pixel array, the first repair line crossing the source lines and in an initial state being electrically insulated from the source lines, the second repair line crossing the source lines and in an initial state being electrically insulated from the source lines, the first dummy line crossing the gate lines, the first repair line, and the second repair line, the first dummy line in an initial state being electrically insulated from the gate lines, the first repair line, and the second repair line, the second dummy line crossing the gate lines, the first repair line, and the second repair line, and the second dummy line in an initial state being insulated from the gate lines, the first repair line, and the second repair line, and the first dummy line and the second dummy line being not electrically connected to pixels of the pixel array;

electrically connecting the first source line section to the first repair line;

electrically connecting the second source line section to the second repair line;

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electrically connecting both of the first repair line and the second repair line to either the first dummy line or the second dummy line; and

cutting the first repair line and the second repair line to electrically connect the first source line section to the second source line section via a portion of the first repair line, either the first dummy line or the second dummy line, and a portion of the second repair line.

2. The repairing method for the display device of claim 1, wherein either the first dummy line or the second dummy line is electrically connected to the at least one source driver unit, the repairing method further comprising:

electrically disconnecting either the first dummy line or the second dummy line from the at least one source driver unit.

3. The repairing method for the display device of claim 2, wherein the step of electrically disconnecting either the first dummy line or the second dummy line is cutting by laser.

4. The repairing method for the display device of claim 1, wherein the steps of electrically connecting the first source line section to the first repair line, electrically connecting the second source line section to the second repair line, and electrically connecting both the first repair line and the second repair line to either the first dummy line or the second dummy line are welding by laser.

5. The repairing method for the display device of claim 1, wherein the step of cutting the first repair line and the second repair line is by laser.

6. A repairing method of a display device, the display device comprising a pixel array, at least one gate driver unit, and at least one source driver unit, the pixel array comprising a plurality of gate lines and a plurality of source lines, one of the gate lines being divided into a first gate line section and a second gate line section, the first gate line section and the second gate line section being discrete, the first gate line section electrically connected to the at least one gate driver unit, the repairing method comprising the following steps:

providing a first repair line disposed between the pixel array and the at least one source driver unit, a second repair line disposed opposite to the first repair line on the pixel array, a first dummy line disposed at one side of the pixel array, and a second dummy line disposed opposite to the first dummy line on the pixel array, the first repair line crossing the source lines and being electrically insulated from the source lines in an initial state, the second repair line crossing the source lines and being electrically insulated from the source lines in an initial state, the first dummy line crossing the gate lines, the first repair line, and the second repair line, the first dummy line in an initial state being electrically insulated from the gate lines, the first repair line, and the second repair line, the second dummy line crossing the gate lines, the first repair line, and the second repair line, and the second dummy line in an initial state being insulated from the gate lines, the first repair line, and the second repair line;

electrically connecting the first gate line section to the first dummy line;

electrically connecting the second gate line section to the second dummy line;

electrically connecting both the first dummy line and the second dummy line to either the first repair line or the second repair line; and

cutting the first dummy line and the second dummy line to electrically connect the first gate line section to the second gate line section via a portion of the first dummy

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line, either the first repair line or the second repair line, and a portion of the second dummy line.

7. The repairing method for the display device of claim 6, wherein the first dummy line and the second dummy line are electrically connected to the at least one source driver unit, the repairing method further comprising:

electrically disconnecting both the first dummy line and the second dummy line from the at least one source driver unit.

8. The repairing method for the display device of claim 7, wherein the step of electrically disconnecting both the first dummy line and the second dummy line is cutting by laser.

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9. The repairing method for the display device of claim 6, wherein the steps of electrically connecting the first gate line section to the first dummy line, electrically connecting the second gate line section to the second dummy line, and electrically connecting both the first dummy line and the second dummy line to either the first dummy line or the second dummy line are welding by laser.

10. The repairing method for the display device of claim 6, wherein the step of cutting the first dummy line and the second dummy line is by laser.

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